Memorandum

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Office of Water Quality Programs 11th Floor, 629 East Main Street, Richmond, VA

SUBJECT: 2008 Citizen Water Monitoring Grant Request for Proposals

TO: Interested Citizens

FROM: James E. Beckley, Water Quality Data Liaison

DATE: July 3, 2007

COPIES: Ellen Gilinsky, Alan Pollock, Darryl Glover

We are pleased to make available the 2008 Citizen Water Quality Monitoring Grant Program Request for Proposals (RFP). The complete RFP package (RFP and Attachments) can be downloaded from the Department of Environmental Quality (DEQ) Citizen Monitoring Program Grant web page at www.deq.virginia.gov/cmonitor/grant.html. These grants provide funding for water quality monitoring groups and individuals to monitor the quality of Virginia's waters. The maximum possible grant award this year is $5,000.00 per proposal.

In addition, DEQ is also offering a mini-Citizen Monitoring Grant. This mini-grant is for organizations that are new to water quality monitoring. The mini-grant maximum award is $1,000.00. Applicants can only apply for either a regular Citizen Monitoring Grant or a mini-grant.

The primary purpose of these grants is to provide funds for water quality monitoring projects. The grant can be used in a variety of ways, including purchasing water quality monitoring equipment, training citizen volunteers, lab analysis costs, and promoting stream monitoring efforts in locations where DEQ is not currently collecting water quality samples.

To be eligible for funding under the regular Citizen Monitoring Grant, a grantee must follow certain guidelines, including developing a quality assurance project plan (QAPP). Any applicant who has a QAPP already approved by DEQ will not need to resubmit this component unless there have been significant changes. A grantee must also submit a copy of all data generated by their funded project to DEQ.

For the mini-grant, a grant applicant must not have received a Citizen Monitoring Grant award (regular or mini-grant) during the past three years. In addition, the grantee must use at least one-third of the grant money to purchase kits and begin water monitoring before the end of the grant period. A QAPP is not necessary for the mini-grant award.

Collaboration between state agencies, citizen monitors, and other organizations is key to developing monitoring programs that collect data for multiple possible uses. While the grant program provides funding for the development of these programs, technical assistance with developing a water quality monitoring program and/or a QAPP is also available through the Virginia Citizen Water Quality Monitoring Program. Contact information is listed below and is available on the DEQ citizen monitoring website www.deq.virginia.gov/cmonitor. Monitoring groups are strongly encouraged to utilize this resource.

If you have any questions about the Citizen Water Quality Monitoring grant or if you would like to discuss developing a water quality monitoring program, QAPP, or have any other questions, please do not hesitate to contact me at (804) 698-4025 or by email at jebeckley@deq.virginia.gov.

2008 Citizen Water Quality Monitoring Grant Program
Request for Proposals
Deadline August 31, 2007

Purpose

The purpose of the Citizen Water Quality Monitoring Grant Program is to generate scientifically accurate, citizen-collected, water quality data. The program is meant to provide guidance and support for citizen water quality monitoring and stewardship programs. Funded projects may focus on any or all of the following five categories:

1. **List and delist impaired waters on the 303(d) Impaired Waters List**
2. **Identify sources of pollution that may help in Total Maximum Daily Load (TMDL) development**
3. **Track progress of TMDL or other restoration activities**
4. **Identify waters for future monitoring by DEQ**
5. **Educating the community on local impacts to water quality and land use activities**

Background

The Citizen Water Quality Monitoring Grant Program was established by a budget amendment in the 1999 Virginia General Assembly Session. The General Assembly based this budget amendment on the *Citizen Water Quality Monitoring Grant Report* submitted by DEQ regarding the feasibility of a grant to fund citizen monitoring activities. In 2007, the General Assembly allocated general funds for eligible activities by citizen monitoring organizations in Virginia. These funds must be expended by December 31, 2008.

General Eligibility

Funds are available to conduct water quality monitoring, assist in the development of citizen water quality monitoring programs, and citizen volunteer monitoring coordination. Any community, watershed or conservation organization, Soil & Water Conservation District, secondary school, college, or university using volunteer monitors in Virginia may apply for these funds. The maximum possible grant award is $5,000. Only one grant may be awarded per project or grantee per grant year. Grants are awarded on a competitive basis. Because of the limited funds available, partial funding may be awarded to maximize the effectiveness of the program**.** No match is required to receive the grant, but funding from other sources is encouraged. Grant awardees must be able to provide DEQ with a Federal Tax Identification Number. **Grant funds will not be provided for office space, salary for staff or staff benefits.** Funded activities can begin as soon as January 1, 2008 and must be completed by December 31, 2008.

Eligible Activities

Eligible activities include but are not limited to:

- Equipment costs such as field test kits, probes, reagents, nets, and field manuals.
- Training of citizen volunteers by professional organizations on water quality monitoring procedures.
- Biological field sampling such as Virginia Save Our Streams (VA SOS) and/or chemical parameter sampling following an approved QAPP.
- Certain administrative costs such as newsletters, recruitment, training, educational materials, and fees for articles of incorporation.
- Laboratory analysis costs. Provided that the following conditions are met:
    1) The analysis is conducted at a laboratory with DEQ-approved standard operating procedures and quality control/quality assurance protocols (these procedures must be submitted with the application package if they have not been submitted previously).
    2) Sampling locations are not in areas where the data is not considered useful for water quality assessments, such as in mixing zones and near discharge pipes. Please contact James Beckley, or your local DEQ regional office for assistance.
    3) Water samples are not collected during spill events.
    4) Water samples are representative of the stream (i.e. mid-channel just below the water surface) and are collected in safe locations on public property or where landowner permission has been obtained.
    5) Data are submitted electronically to DEQ using the online database provided by DEQ.

Evaluation Criteria (Citizen Grant- max $5,000)

A review committee will rank proposals based upon the following criteria:

- Monitoring plan identifies site locations, parameters, methodology, and is consistent with the purpose of the Citizen Water Quality Monitoring Grant Program. (see Attachments 2 and 3) (**25 points**)
- Develop or possess a DEQ-approved quality assurance project plan (QAPP) (If a QAPP is necessary, a free template and directions are available online at www.deq.virginia.gov/cmonitor/grant.html) (**15points**).
- Description of coordination with DEQ, and/or other monitoring organizations to identify appropriate sites that will provide useful data. (**15 points**)
- Have filled out a data use authorization from for DEQ to identify how your group wishes the agency to use data you collect. (see Attachment 1) (**10 points**)
- Description of specific outcomes/deliverables of project. (**10 points**)
- Description of how the monitoring network will be sustained beyond the grant period. (**10 points**)
- Special merit of the project such as enhancement of citizen monitoring efforts in general or providing further information on a methodology that can be transferred to other citizen monitoring organizations. (**5 points**)
- Description of local citizen involvement and specific watershed identified (must include both stream name and Virginia Department of Conservation and Recreation Hydrologic Unit code) Please contact James Beckley, if assistance is needed. (**5 points**)
- Participation in other water quality programs/initiatives such as environmental education, Adopt-A-Stream, stream bank restoration, etc. (**5 points**)
- Previous Citizen Water Quality Monitoring Grant recipient that did not comply with grant requirements within the past five (5) years (**-25 points**)

Application Procedures

Original and four copies of the entire proposal package must be received no later than **4:30 p.m. on Friday, August 31, 2007,** at the following address:

Mail Delivery:
James Beckley
VA Dept. of Environmental Quality
Water Quality Monitoring
P.O. Box 1105
Richmond, VA 23218

Street Delivery:
James Beckley
VA Dept. of Environmental Quality
Water Quality Monitoring
629 East Main Street
Richmond, VA 23219

No exceptions will be made to this deadline. Notification of awards will be made by October 19, 2007. Funds to be awarded will become available when a contract has been signed and returned to DEQ. 100% of the award may be distributed when the signed contract and a written request for payment are returned. For groups who do not have a Quality Assurance Project Plan (QAPP), with the exception of education projects, one must be developed, before grant funds will be disbursed. If a QAPP is not developed and approved by DEQ, future grant applications from the organization may be disqualified.

Contractual Agreements

All work to be accomplished through the Citizen Monitoring Grant Program must be legally embodied in a contract with the grant proposal. This contract will serve as a memorandum of agreement in accordance with the adoption of the Code of Virginia §62.1-44.19:11. This contract will be between the grantee (or designee) and DEQ. Upon submission of both a signed contract agreement and a written request for payment, grant funds will be made available to the grantee. If at any time the grantee organization cannot fulfill the requirements of the contract, the remainder of the grant funds and/or any equipment purchased through the grant must be returned to the DEQ Citizen Monitoring Grant Program for redistribution.

Report Requirements

Progress reports providing updates on the project are required according to the schedule below:

Draft QAPP: December 31, 2007 (draft due to DEQ for review, if a QAPP is required)
Final QAPP: February 29, 2008 (if applicable)
Final Report: February 28, 2009 (all monitoring data must be uploaded to the online DEQ database. No other submissions of raw data will be accepted.)

In an effort to conserve paper, electronic submission of the final report is encouraged. These reports can be submitted by either a CD R/RW or by e-mail to jebeckley@deq.virginia.gov. Final reports should consist of the following:

1. The actual report.
2. Copies of all raw datasheets and forms used in the project.

If necessary, a hardcopy of these items can be sent to the address below. Water quality data collected using grant funds are to be submitted to an online database operated by DEQ. Instructions on how to upload this data will be provided when grant awards are announced in the fall of 2007. The database will allow grant recipients to upload water quality data collected during the course of the project. The public can view this data by accessing the website.

If the organization does not continue monitoring beyond the grant period, any equipment, such as meters or unopened reagents, purchased with Citizen Monitoring Grant Program funds must be returned to DEQ at the address listed below to be redistributed or used for future training sessions.

Please direct any questions to:

James Beckley,
Water Quality Data Liaison
Department of Environmental Quality
P.O. Box 10009
Richmond, VA 23240
804-698-4025 (phone)
804-698-4083 (fax)
jebeckley@deq.virginia.gov (E-mail)

Virginia Department of Environmental Quality
2008 Citizen Water Quality Monitoring Grant Program Application

The entire proposal package (not to exceed 10 pages, excluding laboratory procedures) must be received by **4:30 p.m. on August 31, 2007,** to be considered for the Citizen Water Quality Monitoring Grant Program. Five copies of the proposal package (one original and four photocopies) are required.

1) The Organization and Contact Information:

Name of applicant organization (must be able to provide a Federal ID Number)

Brief description of your organization:

Project contact person:	
Contact person phone number:	
Contact person email:	
Mailing address for grant correspondence :	

2) The Project:

Brief description of monitoring activities/project:

Dates for which funding is requested (must not extend beyond January 1, 2008 – December 31, 2008) _____ to _____

3) The Budget:

Amount requested from DEQ (not to exceed $5,000): _____ Total budget _____

4) Application Package: All information outlined on the back of this form must be included in the proposal package.

5) The Signature:

_____

Approval of Organization's Chief Officer

_____

Print Name Title Date

2008 Citizen Water Quality Monitoring Grant Program
Proposal Package Requirements

The complete proposal package should not exceed ten pages (excluding laboratory procedures).

Please be sure that all of the following information is included in this proposal package:

☐ Citizen Water Quality Monitoring Grant Program Application includes:

- ☐ Cover Page
- ☐ Application Form (2 pages)

☐ Data Use Authorization Form: Fill out and return Attachment 1 to identify how your organization wishes to have DEQ use your monitoring data

☐ Monitoring Plan: Use Attachment 2 to provide a complete preliminary Quality Assurance Monitoring Plan (QAMP)

☐ Federal Tax Identification Number: If a grant is awarded to your organization, you must be able to provide a Federal Tax Identification Number. This number can be provided on this application or upon notification of an award. _____

☐ Copies: Five complete proposal packages (one original and four copies) must be received by **4:30 p.m. on August 31, 2007,** at the following address:

Mail Delivery
James Beckley
Water Quality Data Liaison
Virginia Dept. of Environmental Quality
P.O. Box 1105
Richmond, Virginia 23218

Street Address
James Beckley
Water Quality Data Liaison
VA Dept. of Environmental Quality
629 East Main Street
Richmond, Virginia 23219

Please direct any questions to: James Beckley at 804-698-4025 or jebeckley@deq.virginia.gov

2008 Citizen Water Quality Monitoring Grant Program Application

Additional pages may be attached as needed.

1. Please describe the specific goals of this project:

2. Please identify watershed(s) in which project is located (please specify DCR watershed code in addition to stream name. Please contact James Beckley, DEQ Water Quality Data Liaison if assistance is needed.):

3. Please identify whether this project is located on any impaired stream segments (by name) identified on the 303(d) TMDL list:

4. Please describe any other citizen monitoring or volunteer organization activities located within the same watershed(s) where this project will occur:

5. Please describe items to be funded with this grant:

6. Include a line item budget for this project (please provide an additional sheet if necessary):

Equipment Costs (please specify):		$
Laboratory Costs (please specify):		$
Administrative Costs (please specify):		$
Other (please specify):		$
Total:		$

7. Please describe local citizen involvement with the project (are volunteers performing the work?):

8. Please describe any coordination with DEQ, DCR, and other monitoring organizations to identify appropriate sites:

9. Please describe any partnerships or cooperation with other organizations or agencies that this project will develop or enhance:

10. Please describe specific expected outcomes/deliverables of this project:

11. Please describe other water quality programs/initiatives that the organization participates in (such as environmental education, Adopt A Stream, stream bank restoration):

12. Please describe how the monitoring network will be sustained beyond the grant period:

13. Please identify if this is a new project or continuation of an existing project:

14. Please identify whether a quality assurance project plan (QAPP) will be developed or enhanced during the project period (or whether the project will operate under an existing DEQ-approved plan):

15. Please include any other information you feel is necessary for the review of this grant proposal (including any experience in water quality sampling and/or data collection):

2008 Citizen Water Quality Monitoring Mini-Grant Program
Request for Proposals
Deadline August 31, 2007

Purpose
The Citizen Water Quality Monitoring Mini-Grant Program promotes citizen monitoring by providing money to help in forming a new citizen monitoring group. The grant does not require a Quality Assured Project Plan (QAPP) and many of the other requirements found in the regular Citizen Monitoring Grant.

General Eligibility
Funds are available to conduct water quality monitoring, assist in the development of citizen water quality monitoring programs, and citizen volunteer monitoring coordination. Any group that uses volunteer monitors in Virginia may apply for these funds. The maximum possible mini-grant award is $1,000. Only one grant may be awarded per project or grantee per grant year. Mini-grants are awarded on a competitive basis. No match is required to receive a mini-grant, but funding from other sources is encouraged. Grant awardees must be able to provide DEQ with a Federal Tax Identification Number. **Grant funds will not be provided for office space, salary for staff or staff benefits.** Funded activities can begin as soon as January 1, 2008 and must be completed by December 31, 2008.

Eligible Activities
Eligible activities include but are not limited to:
- Equipment costs such as field test kits, probes, reagents, nets, and field manuals.
- Training of citizen volunteers by professional organizations on water quality monitoring procedures.
- Biological field sampling such as Virginia Save Our Streams (VA SOS) and/or chemical parameter sampling
- Certain administrative costs such as newsletters, recruitment, educational materials, and fees for articles of incorporation.

Application Procedures
Original and four copies of the mini-grant application, data use authorization form (Attachment 1), and monitoring plan (Attachment 2) must be received no later than **4:30 p.m. on Friday, August 31, 2007,** at the following address:

Mail Delivery:
James Beckley
VA Dept. of Environmental Quality
Water Quality Monitoring
P.O. Box 10009
Richmond, VA 23240

Street Delivery:
James Beckley
VA Dept. of Environmental Quality
Water Quality Monitoring
629 East Main Street
Richmond, VA 23219

No exceptions will be made to this deadline. Notification of awards will be made by October 19, 2007. Funds to be awarded will become available when a contract has been signed and returned to DEQ. 100% of the award will be distributed when the signed contract and a written request for payment are returned.

Contractual Agreements

All work to be accomplished through the Citizen Monitoring Grant Program must be legally embodied in a contract with the grant proposal. This contract will serve as a memorandum of agreement in accordance with the adoption of the Code of Virginia §62.1-44.19:11. This contract will be between the grantee (or designee) and DEQ. Upon submission of both a signed contract agreement and a written request for payment, grant funds will be made available to the grantee. If at any time the grantee organization cannot fulfill the requirements of the contract, the remainder of the grant funds and/or any equipment purchased through the grant must be returned to the DEQ Citizen Monitoring Grant Program for redistribution.

Report Requirements

Final Report: February 28, 2009 (all monitoring data must be uploaded to the online DEQ database. No other submissions of raw data will be accepted.)

In an effort to conserve paper, electronic submission of the final report is encouraged. These reports can be submitted by either a CD R/RW or by e-mail to jebeckley@deq.virginia.gov. Final reports should consist of the following:

1. The actual report.
2. Copies of all raw datasheets and forms used in the project.

If necessary, a hardcopy of these items can be sent to the address below. Water quality data collected using grant funds are to be submitted to an online database operated by DEQ. Instructions on how to upload this data will be provided when grant awards are announced. The database will allow grant recipients to upload water quality data collected during the course of the project. The public can view this data by accessing the website.

If the organization does not continue monitoring beyond the grant period, any equipment, such as meters or unopened reagents, purchased with Citizen Monitoring Grant Program funds must be returned to DEQ at the address listed below to be redistributed or used for future training sessions.

Please direct any questions to:

James Beckley,
Water Quality Data Liaison
P.O. Box 1105
Richmond, VA 23218
804-698-4025 (phone)
804-698-4083 (fax)
jebeckley@deq.virginia.gov (E-mail)

Virginia Department of Environmental Quality
2008 Citizen Water Quality Monitoring Mini-Grant Program Application

The entire proposal package must be received by **4:30 p.m. on August 31, 2007,** to be considered for the Citizen Water Quality Monitoring Mini-Grant Program. Five copies of the proposal package (one original and four photocopies) are required.

1) **The Organization and Contact Information:**
Name of applicant organization (must be able to provide a Federal ID Number)

Brief description of your organization:

Project contact person:	
Contact person phone number:	
Contact person email:	
Mailing address for grant correspondence :	

2) **The Project:**
Brief description of monitoring activities/project:

Dates for which funding is requested (must not extend beyond January 1, 2008 – December 31, 2008) _____ to _____

3) **The Budget:**
Amount requested from DEQ (not to exceed $1,000): _____ Total budget _____

4) **Application Package:** All information outlined on the back of this form must be included in the proposal package.

5) **The Signature:**

_____
Approval of Organization's Chief Officer

_____
Print Name Title Date

Citizen Water Quality Monitoring Mini-Grant Program Application

The grant review committee will review applications using a 50-point scoring system. Point values are assigned to the questions in the application as indicated below. Please answer the questions in a clear and concise manner.

1. Please describe the goals of your project. What do you wish to do using the grant funds and how will you go about doing it? Please include the number of volunteers committed to monitoring (10 points)

2. Please describe your monitoring strategy. In addition, please fill out and return Attachment 2. (10 points)

3. Please provide a budget that you wish to use the grant award for. At a minimum, 33% of the grant award is to go to collect or analyze water quality samples. You can attach additional pages if necessary. (10 points)

Equipment Costs (please specify):		$
Laboratory Costs (please specify):		$
Administrative Costs (please specify):		$
Other (please specify):		$
Total:		$

4. Are local volunteers helping with the project? Please describe any partnerships with other organizations or agencies that this project will develop or enhance. (10 points)

5. Please describe how the monitoring organization will be sustained beyond the grant period. (5 points)

6. Please list any grants awarded during the past three years that paid for volunteer water quality monitoring. Please include any grants awarded to organizations that the grant applicant is a member of. (5 points)

Use Authorization Form for Water Quality Data

Name of Group or Organization:		**Date:**	
Name of Submitter:		**Role or Title** (QA officer, leader, etc.)	
Type(s) of Monitoring Conducted by Organization?	☐ **Chemical** (pH, dissolved oxygen nutrients, etc.)	☐ **Physical** (Temperature, stream flow, etc.)	☐ **Biological** (Macroinvertebrate, E. coli, etc.)

Type of Organization	☐ Citizen Volunteer	☐ Federal Agency	☐ State Agency	☐ Local Agency
	☐ Business or Industry	☐ College or University	☐ Other (Name):	

On behalf of the group identified above, we agree that the Virginia Department of Environmental Quality (DEQ) may use water quality monitoring data we generate per our selection(s) below. Our choice(s) will remain in effect unless or until our organization submits changes in the future.

Options for Uses of Your Data (may select more than one)

☐ **1. List and delist impaired waters on the 303(d) Impaired Waters List**
Data recognized by DEQ as Level III can be used to list or delist water on the 303(d) impaired waters list. We understand that 303(d) listed waters do not meet minimum water quality standards in Virginia and a Total Maximum Daily Load (TMDL) may eventually be developed to improve water quality.

☐ **2. Source identification for TMDL development for waters already listed as impaired**
Level III data can be used in conjunction with DEQ monitored data to identify sources of pollution for 303(d) listed waters for TMDL development. We understand that our data will not be used by itself, without water quality data collected by DEQ, wherever possible.

☐ **3. Track progress of a TMDL Implementation Plan and other restoration**
Level II or III data can be used to track the progress of restoration in a TMDL waterbody including installed Best Management Practices or to identify areas where other restoration efforts are taking place.

☐ **4. Identify waters for future DEQ monitoring**
Level II or III data can be used to identify a waterbody for follow-up monitoring by DEQ. We understand that DEQ may not be able to monitor at these locations and/or assess water quality for some period of time.

☐ **5. Educate land owners on the water quality impacts of land use activities**
All levels of data can be used to help in educating the community about water quality and land use activities.

Signature (if submitting by mail or fax)**:** _____

Mail:	VA DEQ James Beckley (11th floor) P. O. Box 1105 Richmond, VA. 23219	**Fax**:	James Beckley VA DEQ (804) 698-4116	**E-mail**:	jebeckley@deq.virginia.gov

2008 Citizen Water Quality Monitoring Grant Program Application
Monitoring Plan

Organization name	
Date	
Watershed(s) monitored	

Specific Goals of Monitoring Program

Identify data users/uses of the data/mechanism of reporting data. Will data be reported to DEQ using the online database? (Instructions for uploading data will be available starting in September of 2006)

Monitoring Sites (Use additional sheets if necessary)

Site # *	Purpose*	Useful for water quality assessments (refer to Attachment 2, Evaluation Criteria Bullet #4) to describe site location.	Sampling Frequency (ex. once per month, etc)	Latitude (may be obtained from www.topozone .com)	Longitude (may be obtained from www.topozone .com)

* If not known, estimate the number of sites, the purpose for these sites (there can be more than one purpose), and parameters to be measured

Chemical Parameter	Methodology (i.e. lab, LaMotte model #, HACH model #, EPA Method #, etc)
Dissolved Oxygen	
pH	
Ammonia-Nitrogen	
Nitrate-Nitrogen	
Total Nitrogen	
Total Phosphorus	
Ortho Phosphorus	
Alkalinity	
Turbidity	
Conductivity	
Other (specify)	
Other	

Physical Parameter	Methodology
Temperature	
Stream Flow	
Other (specify)	

Biological Parameter	Methodology (i.e. VA SOS Modified Method, or Audubon Naturalist Society)
Macroinvertebrate	
Other (specify)	
Other	

If grant funds are requested for laboratory analysis, have these laboratory SOPs and quality control/ quality assurance procedures been submitted to DEQ (either previously or with this proposal package)?

If a laboratory is being used to analyze samples, what is the name and location of the laboratory?

Developing of a Monitoring Plan

Before beginning a stream monitoring study, the volunteer program should develop a design or plan that answers the 10 basic questions listed below. Without answers to these questions, the monitoring program might well end up collecting data that do not meet anyone's needs. The answers to these questions should be compiled in a Study Design Plan, a monitoring plan.

Answers will likely change as the program matures. For that reason, it is important to periodically update your monitoring plan. For example, program coordinators might find that a method is not producing high enough data quality, data collection is too labor-intensive or expensive, or additional parameters need to be monitored.

1. Why is the monitoring taking place?

Defining why monitoring is taking place is the backbone of any monitoring activity. Once this question is answered, other questions about the stream monitoring program are easily answered (such as where to monitor, what parameters, etc.) Typical reasons for initiating a volunteer monitoring project include:

- Developing baseline characterization data
- Documenting water quality changes over time
- Screening for potential water quality problems
- Determining whether waters are safe for swimming
- Providing a scientific basis for making decisions on the management of a stream or watershed
- Determining the impact of land use activity (urban, industrial, agricultural, etc)
- Educating the local community or stream users to encourage pollution prevention and environmental stewardship
- Showing public officials that local citizens care about the condition and management of their water resources.

2. Who will use the monitoring data?

Knowing you data users is essential to the program development process. Answering this question will help answer future questions about the monitoring program such as the type of data that is needed and the quality of data that is needed. Potential data users might include:

- State, county, or local water quality analysts
- The volunteers themselves
- Fisheries biologists
- Universities
- School teachers
- Environmental organizations
- Parks and recreation staff
- Local planning and zoning agencies
- State environmental agencies
- State and local health departments
- Soil and water conservation districts
- Federal agencies such as the U.S. Geological Survey or the U.S. Environmental Protection Agency

Each of these users will have different data requirements. Some users, such as government analysts and planning/zoning agencies, will have more stringent requirements than others and will require higher levels of quality assurance. As the volunteer monitoring project is being designed, program coordinators should contact as many potential information users as possible to determine their data needs. It is important to have at least one user committed to receiving and using the data. In some cases, that user might be the monitoring group itself.

3. How will the data be used?

The range of uses of volunteer data is limited only by the imagination. Volunteer data could be used, for example, to influence local planning decisions about where to site a sewage treatment facility or to publicize a water quality problem and seek community solutions. Collected data could also be used to educate primary school children about the importance of water resources. Other data uses include the support of:

- Local zoning requirements
- A stream protection study
- State preparation of water quality assessments

- Screening waters for potential problems
- The setting of statewide priorities for pollution control

Each data use potentially has different requirements. Knowing the ultimate uses of the collected data will help determine the right kind of data to collect and the level of effort required to collect analyze, store, and report them.

4. What parameters or conditions will be monitored?

Determining what to monitor will depend on the needs of the data users, the intended use of the data, and the resources of the volunteer monitoring program. If the program's goal is to determine whether a creek is suitable for swimming, for example, a human-health-related parameter such as E. coli bacteria should be monitored. If the objective is to characterize the ability of a stream to support sport fish, volunteers should examine stream habitat characteristics, the aquatic insect community, and water quality parameters such as dissolved oxygen and temperature. Alternatively, if a program seeks to provide baseline data useful to state water quality or natural resource agencies, program designers should consult those agencies to determine which parameter they consider of greatest value.

Money for test kits or meters, available laboratory facilities, help from state or university advisors, and the abilities and desires of volunteers will also clearly have an impact on the choice of parameters to be monitored.

Common River Water Quality Indicators

BIOLOGICAL	PHYSICAL	CHEMICAL
Indicator bacteria (E. coli)	Width, depth	PH
Benthic macroinvertebrates	Temperature	Dissolved Oxygen
Algae (chlorophyll a)	Velocity (flow)	conductivity
	Clarity (suspended solids)	phosphorus
	Water color	nitrogen
	Habitat information (bottom material, stream bank char)	

5. How good does the monitoring data need to be?

Turn to the requirements of the data users, the requirements of the intended data use, and the resources of the monitoring program to define how good the monitoring data needs to be. Once the quality of the data is determined, a quality assurance project plan should be developed. The quality assurance project plan will provide all the necessary steps and precautions needed to achieve the level of data quality required by the monitoring program.

6. What methods should be used?

The methods adopted by a volunteer program depend primarily on how the data will be used and what kind of data quality is needed. There are, of course, many sampling considerations including:

- How samples will be collected (e.g., using grab samples or measuring directly with a meter)
- What sampling equipment will be used (e.g., disposable Whirl-Pak bags, glass bottles, 500-micron mesh size kick net, etc.)
- What equipment preparation methods are necessary (such as container sterilization or meter calibration)
- What protocols will be followed (such as the Winkler method for dissolved oxygen, intensive stream bio assessment approach for habitat and benthic macroinvertebrates, etc.)

Analytical questions must also be addressed such as:

- Will volunteers return to a lab for macroinvertebrate identification or dissolved oxygen titration procedures or conduct them in the field?
- Will a color wheel provide nitrate data of needed quality, or is a more sophisticated approach needed?
- Should visual observation and habitat assessment approaches be combined with turbidity measures to best determine the impact of construction sites?

While sophisticated methods usually yield more accurate and precise data (if properly carried out), they are also more costly and time-consuming. This extra effort and expense might be worthwhile if the goal of the program is to produce high-quality data. Programs with an educational focus, however, can often use less sensitive equipment and less sophisticated methods to meet their goals.

7. Where are the monitoring sites?

Sites should be chosen to reflect the ultimate use of the data and the needs of the data user. *To make your program the most effective, you should consider meeting with state agency data users to look at potential monitoring sites. You can contact the Water Quality Data Liaison at DEQ (804) 698-4025 to discuss potential monitoring sites*. Sites might be chosen for any number of reasons such as:

- accessibility, proximity to volunteers' homes
- value to potential users such as state agencies
- location in problem areas
- Sites representing a range of conditions in the stream watershed (e.g., an upstream pristine area, above and below towns and cities, in agricultural areas and parks, etc.) for baseline studies
- For more specific purposes, such as determining whether a stream is safe to swim in, it might only be necessary to sample selected swimming areas
- For land use impacts (or impact of permitted dischargers) it might be best to monitor upstream and downstream of the area where the source is suspected
- To determine the effectiveness of runoff control measures, a paired watershed approach might be best (e.g., sampling two similar small watersheds, one with controls in place and one without controls.)
- Is there a nearby professionally monitored site to compare volunteer data results to professional data
- Near U.S. Geological Survey gauging stations, which can provide useful data on stream flow

Certainly, for any volunteer program, safety and accessibility (both legal and physical) will be important in determining site location. Most monitoring programs will need to maintain the same sites over time and identify them clearly in their monitoring program design.

When selecting monitoring sites ask the following questions, based on the answers, you may need to eliminate some sites or select alternative locations that meet your criteria:

- Are other groups (local, state, federal agencies; other volunteer groups; colleges) already monitoring this site?
- Can you identify the site on a map and on the ground?
- What does the site represent?
- Does the site have water in it during the times of year that monitoring will take place?
- Is there safe, convenient access to the site (including adequate parking) and a way to safely sample a flowing section of the stream? Is there access all year long?
- Can you acquire landowner permission?
- Can you perform all the monitoring activities and tests that are planned at this site?
- Is the site far enough downstream of drains or tributaries? Is the site near tributary inflows, dams, bridges, or other structures that may affect the results
- Have you selected enough sites for the study you want to do?

Once you have selected the monitoring sites, you should be able to identify them by latitude and longitude. A systematic approach to assigning station identifications should be developed and identified in the monitoring plan!

8. When will monitoring occur?

A program should specify:

- What time of day is best for sampling (Temperature and dissolved oxygen, for example, can fluctuate naturally as the sun rises and aquatic plants release oxygen.)
- What time of year is best for sampling (For example, there is no point in sampling E. coli bacteria at swimming beaches in the winter, when no one is swimming, or sampling intermittent streams at the height of summer, when because of dry conditions the streams hold little water.)

In general, monthly chemical sampling and twice-yearly biological sampling are considered adequate to identify water quality changes over time. Biological sampling should be conducted at the same time each year because natural variations in aquatic insect population and streamside vegetation occur as seasons change. Monitoring at the same time of day and at regular intervals (e.g., at 2:00 p.m., every 30 days) helps to ensure comparability of data over time.

9. How will monitoring data be managed and presented?

The volunteer program should have a clear plan for managing the data collected each year.

- Field and lab data sheets should be checked for completeness
- Data should be screened for outliers
- A database should be developed or adapted to store and manipulate the data. The elements of such a database should be clearly explained in order to allow users to interpret the data accurately and with confidence
- Program coordinators will also have to decide how they want to present data results, not only to the general public and to specific data users, but also to the volunteers themselves

10. How will the program ensure that data is credible?

Developing specific answers to questions 1-9 is the first step in ensuring that data are credible. Credible data meet specific needs and can be used with confidence for those needs. Other steps include:

- Properly training, testing, and retraining volunteers
- Evaluating the program's success after an initial pilot stage and making any necessary adjustments
- Assigning specific quality assurance tasks to qualified individuals in the program
- Documenting in a written plan all the steps taken to sample, analyze, store, manage, and present data

A written plan, known as a quality assurance project plan, can be elaborate or simple depending on the volunteer program's goals. Its essential feature, however, is that it documents how the data are to be generated. Without such knowledge, the data cannot be used with confidence. It is also important for educating future volunteers and data users about the program and the data. People might be analyzing the data 5 or 10 or more years later to study trends in stream quality. (Note: EPA requires that any monitoring program sponsored by EPA through grants, contracts, or other formal agreement must carry out a quality assurance/quality control program and develop a quality assurance project plan.)